

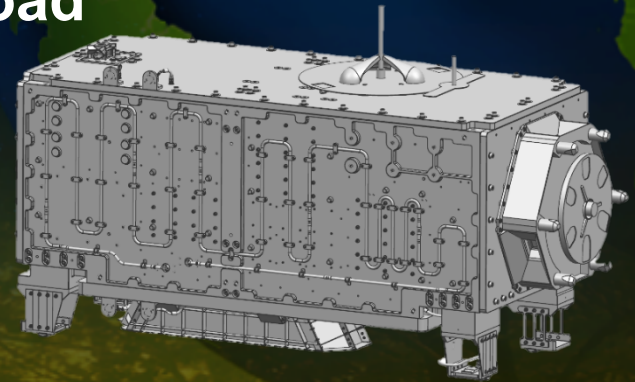


ECOsysteM Spaceborne Thermal Radiometer Experiment on Space Station



ECOSTRESS Payload

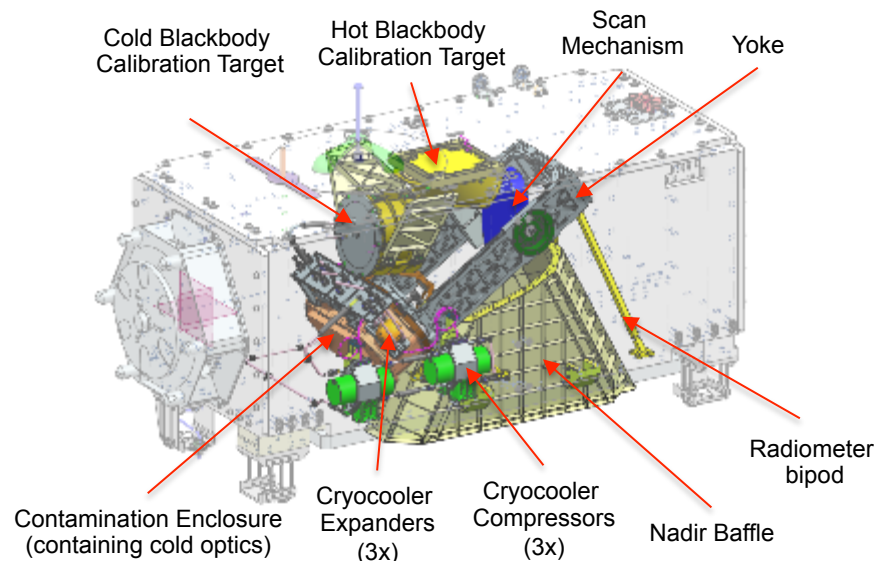
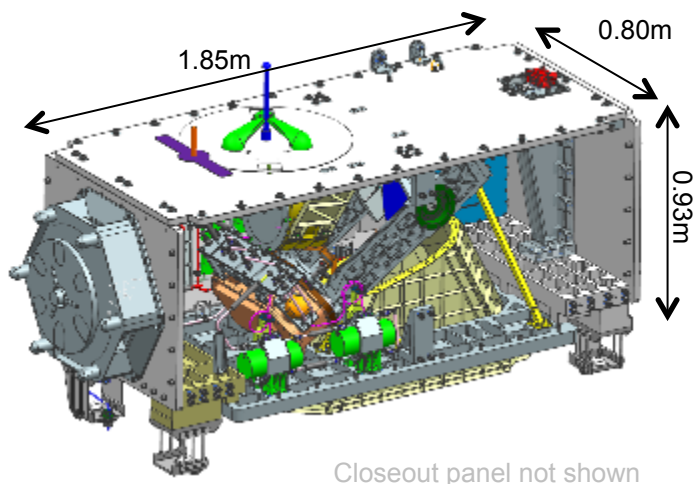
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Payload Overview

- ECOSTRESS is a 5 spectral bands thermal infrared radiometer covering the 8–12.5 μm spectral range
- ECOSTRESS will measure brightness temperatures of Earth over a 400km swath, at a resolution of 69 x 38 m
- ECOSTRESS will measure the temperature of plants and use that information to better understand how much water plants need and how they respond to stress via high spatiotemporal resolution thermal infrared measurements of evapotranspiration from the International Space Station (ISS)



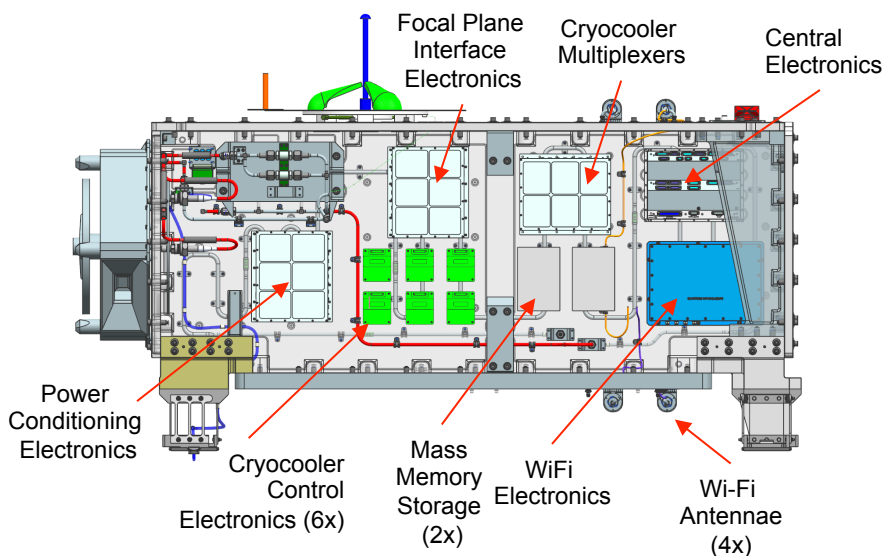
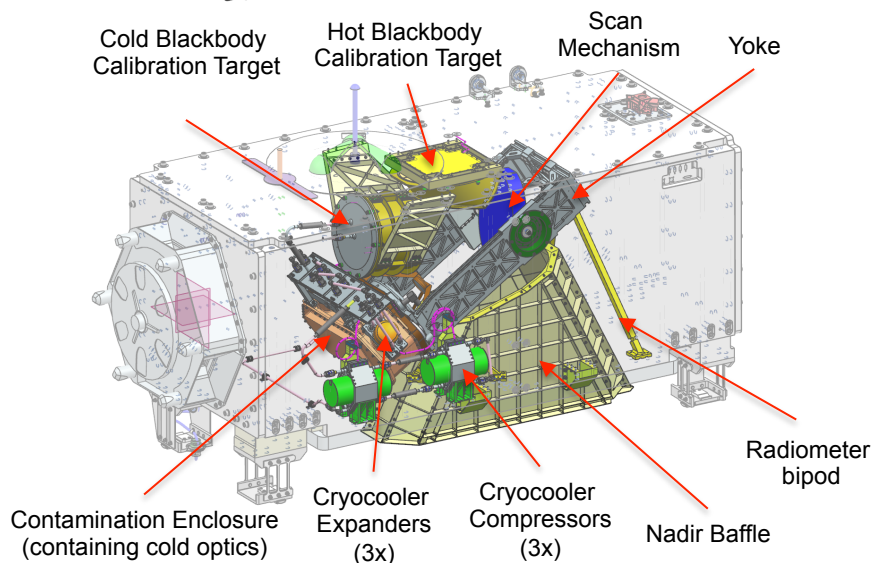
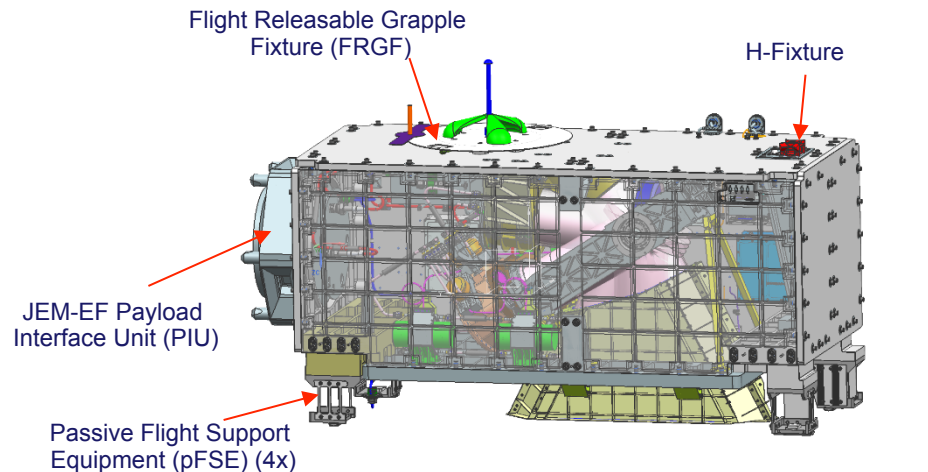
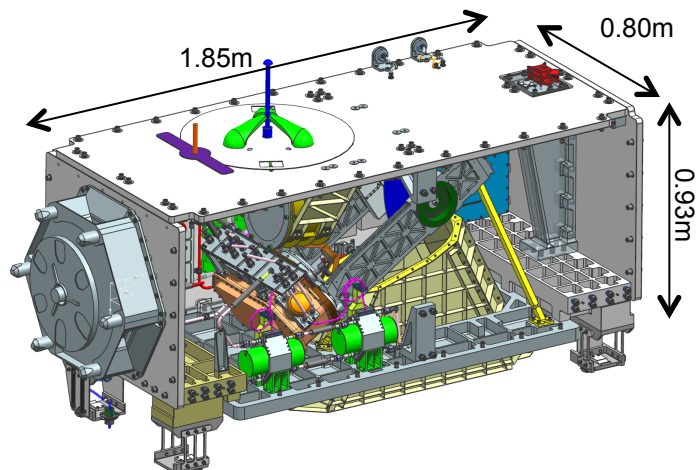


Hardware Approach



- Heritage Hardware and Designs
 - PHyTIR instrument from Instrument Incubator Program (IIP)
 - Payload thermal and structures designs from OCO-3
 - Power Conditioning Electronics (PCE) designs from OCO-3
 - Central Electronics Unit (CEU) designs from SMAP, SIM, and OCO-3
 - Software and firmware designs from OCO-3
 - GSD/MOS from ENose, VCAM and OCO-3
 - SDS from CARVE, SMAP and OCO-3
- COTS Hardware and parts
 - Mass storage units (MSU)
 - Cryocooler and cryocoolers electronics
 - Moxa radio and antenna for Wi-Fi
- New designs
 - Focal Plane Interface Electronics (FPIE)
 - Cryocooler Multiplexer (CCM)
- GFE
 - Payload Interface Unit (PIU), H-Fixture, and Flight Releasable Grapple Fixture (FRGF) from JSC
 - passive Flight Support Equipment (pFSE) from SpX

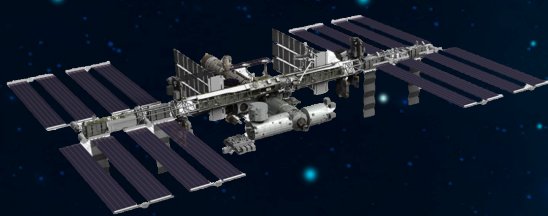
ECOSTRESS Payload Configuration





Accomplishments since CDR

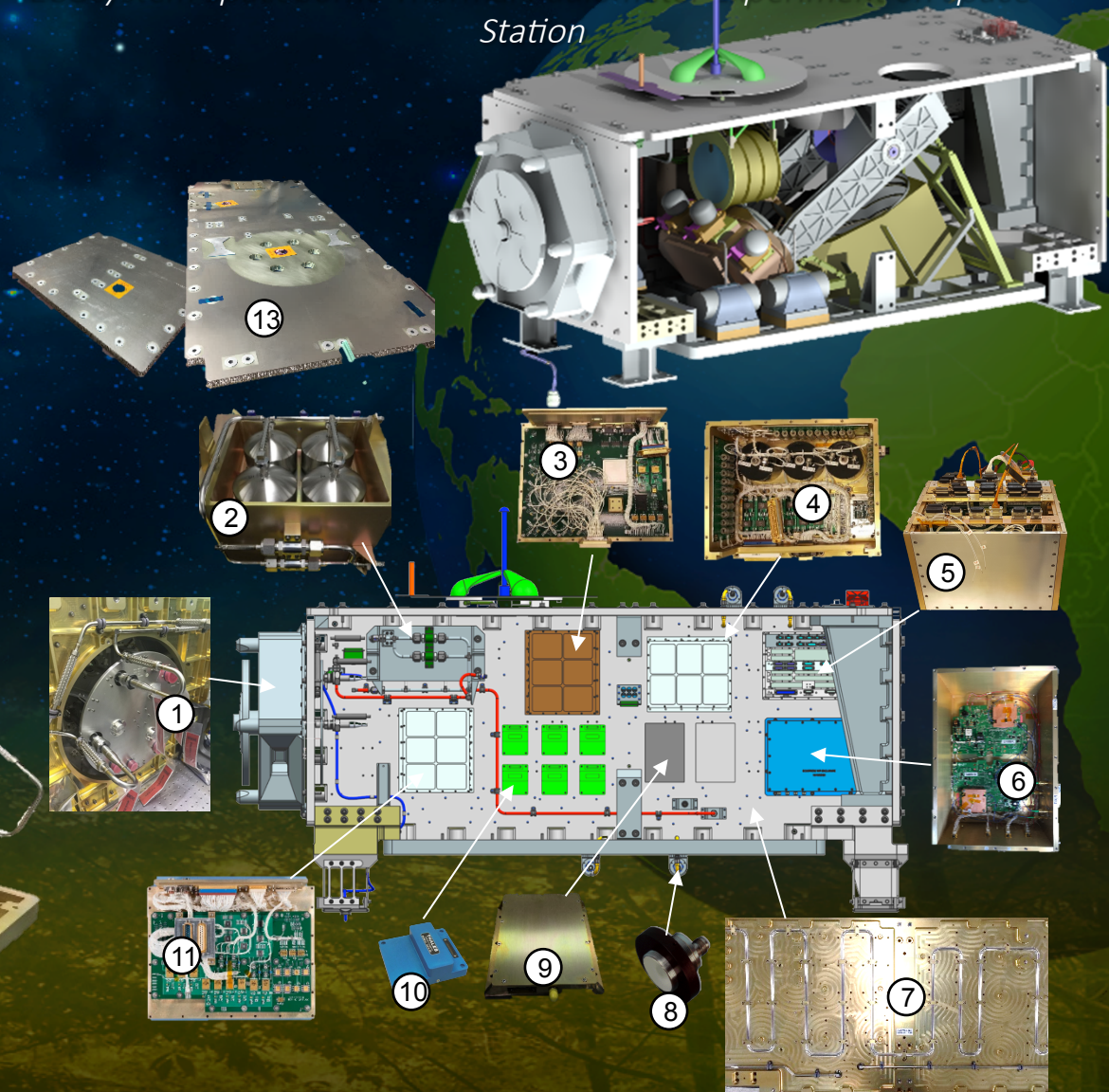
- All flight mechanical parts have been delivered to Payload I&T
- All thermal components have been delivered to Payload I&T, except for the thermal blankets
- The Cryocooler pulse tubes have been redesigned, tested and are now providing a enough cryogenic margin at reduced power
- The radiometer has been tested, aligned, calibrated and delivered to Payload I&T
- The Focal Plane Interface Electronics signal chain board has been redesigned, tested and is now meeting the science requirements
- All the flight cables have been delivered to Payload I&T
- End to end data flow from the focal plane to the GDS server has been tested with flight hardware, firmware and software
- ISS 1553 interface, CEU command/telemetry and control of all the electronics have been tested
- Ambient thermal testing and thermal cycling of electronics have been completed
- Payload has held its Environmental Test Readiness Review (ETRR) and started final integration



ECOSTRESS

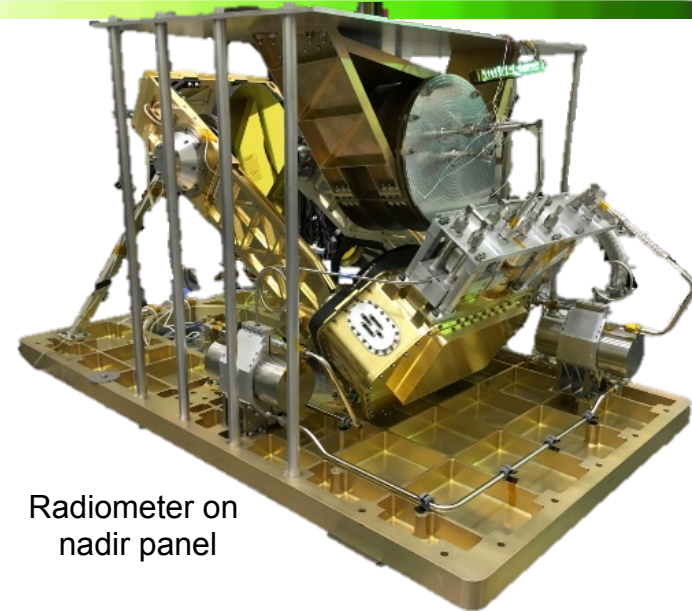
ECOsysteM Spaceborne Thermal Radiometer Experiment on Space Station

1. PIU and PIU panel assembly
2. Accumulator and filter assembly
3. Focal Plane Interface assembly
4. Cryocooler multiplexer assembly
5. Central electronics unit
6. WiFi electronics box assembly
7. Cold Panel
8. WiFi Antenna
9. Mass storage unit
10. Cryocooler electronics
11. Power condition
12. Radiometer Instrument
13. Close out panels

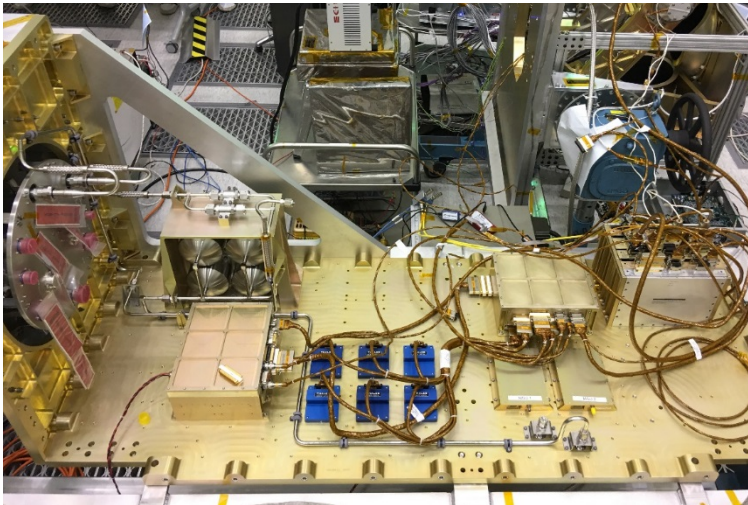


Payload Integration Status

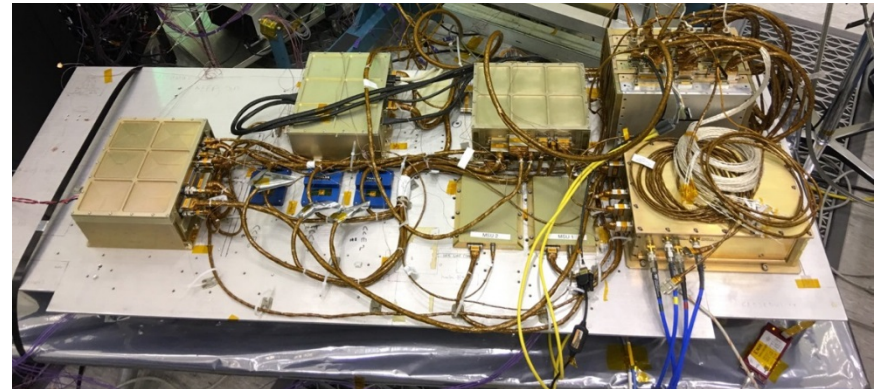
- PIU and cold panels fully integrated with PIU, accumulator assembly, and all fluid lines
- Fit checked all electronics boxes on cold panel
- Laid out and routed all flight cabling on panel with electronics
- Radiometer, cryocoolers, and fluid loop all integrated with nadir panel
- Fit checked payload box structure together
- Operated whole system end-to-end



Radiometer on nadir panel



HRS integration of PIU and cold panel



Electronics and cabling on GSE panel



What's Next



- Complete final payload integration and close out
- Perform functional and performance testing
- Move payload to environmental test facilities in preparation for the following tests;
 - EMC/EMI
 - Vibration
 - Thermal
- Store the payload
- Deliver to KSC for ATLO
- Launch and IOC
- Start Science Operations